CLAIMS

1. A spray pyrolysis method, characterized in that it is applied to the synthesis of nanoparticles with a closed structure of metal chalcogenides having a lamellar crystallographic structure, of the general formula M_aX_b, in which M represents a metal and X a chalcogen, a and b representing the respective proportions of metal and of chalcogen, and in that it comprises pyrolysis of a liquid aerosol obtained from a solution of at least one precursor of a metal (M) and of a chalcogen (X), or of at least one precursor of said metal (M) and of at least one precursor of said chalcogen (X), dissolved in a solvent, said solution being atomized into fine droplets in suspension in a carrier gas.

2. The method as claimed in claim 1, characterized in that it comprises the following steps:
- formation of a solution of said at least one precursor of a metal and of a chalcogen, or of said at least one precursor of said metal and of said at least one precursor of said chalcogen in a solvent,
- atomization of said solution in liquid aerosol form by a nebulizer, in particular of the pneumatic or ultrasonic type, through which the carrier gas is flowing,
- injection of the aerosol into a heated furnace to evaporate the solvent and to react and/or break down said precursor(s) of the metal and of the chalcogen so as to form the nanoparticles,
- transport by the carrier gas of the nanoparticles to the furnace outlet, and
- recovery of the nanoparticles at the furnace outlet.

3. The method as claimed in claim 1 or 2, characterized in that said precursor of the metal and

of the chalcogen contains both the metal and the chalcogen.

4. The method as claimed in claim 3, characterized in that said precursor is of the formula $(A)_cM(X)_d$ in which A is a cation such as K^+, Na^+ or NH_4^+, M is a metal and X a chalcogen, c and d respectively representing the number of cations and chalcogens.

5. The method as claimed in any one of claims 1 to 4, characterized in that said metal is a transition metal selected from among Ti, Zr, Hf, V, Nb, Ta, Mo, W, Re, Co, Ni, Pt, Pd, Cr and Ru.

6. The method as claimed in any one of claims 1 to 4, characterized in that said metal belongs to group III of the Periodic Table of Elements, such as Ga and In.

7. The method as claimed in any one of claims 1 to 4, characterized in that said metal is a metal from group IV of the Periodic Table of Elements, in particular Sn, Pb or Ge.

8. The method as claimed in any one of claims 1 to 4, characterized in that said metal is a metal from group V of the Periodic Table of Elements, such as Bi.

9. The method as claimed in any one of claims 1 to 8, characterized in that the chalcogen is selected from among oxygen, sulfur, selenium or tellurium.

10. The method as claimed in either of claims 4 or 9, characterized in that said precursor is a tetrathiometallate or a tetraselenometallate.

11. The method as claimed in claim 10, characterized in that the metal is molybdenum or tungsten.

12. The method as claimed in any one of claims 1 to 11, characterized in that said carrier gas is an inert gas selected from nitrogen and argon and/or hydrogen.

13. The method as claimed in any one of claims 1 to 12, characterized in that said solvent is a polar solvent, in particular water and/or ethanol.

14. The method as claimed in any one of the preceding claims, characterized in that said nanoparticles are nanotubes, fullerenes and/or nanoboxes.

15. Nanoparticles of metal chalcogenides MX_2, characterized in that they have the form of nanoboxes made up of closed, generally hollow right parallelepipeds and rectangles.